UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/602,791	06/24/2003	William Leon Rugg	STL10987	1683

7590 02/12/2007

Dereck J. Berger
Seagate Technology LLC
Intellectual Property - COL2LGL
389 Disc Drive
Longmont, CO 80503

EXAMINER	
WATKO, JULIE ANNE	
ART UNIT	**PAPER NUMBER**
2627	

SHORTENED STATUTORY PERIOD OF RESPONSE	MAIL DATE	DELIVERY MODE
2 MONTHS	02/12/2007	PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

If NO period for reply is specified above, the maximum statutory period will apply and will expire 6 MONTHS from the mailing date of this communication.

UNITED STATES PATENT AND TRADEMARK OFFICE

Commissioner for Patents
United States Patent and Trademark Office
P.O. Box 1450
Alexandria, VA 22313-1450
www.uspto.gov

BEFORE THE BOARD OF PATENT APPEALS AND INTERFERENCES

Application Number: 10/602,791
Filing Date: June 24, 2003
Appellant(s): RUGG ET AL.

Derek J. Berger
For Appellant

EXAMINER'S ANSWER

This is in response to the appeal brief filed January 29, 2007, appealing from the Office action mailed June 7, 2006.

(1) Real Party in Interest

A statement identifying by name the real party in interest is contained in the brief.

The examiner is not aware of any related appeals, interferences, or judicial proceedings which will directly affect or be directly affected by or have a bearing on the Board's decision in the pending appeal.

(2) Related Appeals and Interferences

The examiner is not aware of any related appeals, interferences, or judicial proceedings which will directly affect or be directly affected by or have a bearing on the Board's decision in the pending appeal.

(3) Status of Claims

The statement of the status of claims contained in the brief is correct.

(4) Status of Amendments After Final

The appellant's statement of the status of amendments after final rejection contained in the brief is correct.

(5) Summary of Claimed Subject Matter

The summary of claimed subject matter contained in the brief is correct.

(6) Grounds of Rejection to be Reviewed on Appeal

The appellant's statement of the grounds of rejection to be reviewed on appeal is correct.

(7) Claims Appendix

A substantially correct copy of appealed claims 1-6, 8-13, 16 and 20 appears on pages 16-18 of the Appendix to the appellant's brief. The minor errors are as follows: Claim 8 has been inadvertently marked with changes from a previous amendment.

(8) Evidence Relied Upon

US Pat. No. 6797882	Crane, Jr. et al	9-2004
US Pat. No. 6243262	Koo	6-2001
US Pat. No. 6388834	Bernett et al	5-2002
EP 0760510 A1	Sega et al	5-1997

(9) Grounds of Rejection

The following ground(s) of rejection are applicable to the appealed claims:

1. Claims 1-2, 4-5 and 8 are rejected under 35 U.S.C. 103(a) as being unpatentable over Sega et al (EP 760510) in view of Crane, Jr. et al (US Pat. No. 6797882 B1).

As recited in claim 1, Sega et al show a data storage device comprising: a base plate (part of 17) having a top surface; a spindle motor 3 positioned on the top surface of the base supporting one or more data storage discs 2 for rotation on the spindle motor 3; an actuator assembly 8 positioned on the top surface of the base plate adjacent the data storage disc; and a printed circuit board 21 assembly on the top surface of the base plate having actuator and motor electronic control components 20 thereon on the top surface of the base.

Additionally, Sega et al show a flex circuit (see especially 14 and 15) connected via connector 16 to the printed circuit board 21 assembly having actuator and motor electronic control components 20 thereon.

As recited in claim 1, Sega et al are silent regarding the printed circuit board being a flex printed circuit board, integral with the flex circuit (including 14 and 15), such that the actuator and motor electronic control components 20 are located on the top surface of the flex printed circuit board.

As recited in claim 1, Crane, Jr. et al teach making integral a printed circuit board with a flexible circuit ("instead of connecting the flexible circuit board 800 to a printed circuit board having active and/or passive elements, a portion of the flexible circuit board 800 may include a stiffener. The stiffened portion of the flexible circuit board 800 can thus replace the printed circuit board described above", see col. 9, lines 53-58).

It would have been obvious to one of ordinary skill in the art at the time the invention was made to replace the printed circuit board of Sega et al with a stiffened portion of the flexible circuit of Sega et al by making integral the printed circuit board and the flexible circuit by adding a stiffener to the flexible circuit of Sega et al as taught by Crane, Jr. et al. The rationale is as follows: one of ordinary skill in the art would have been motivated to replace the board with the stiffened portion in order to simplify assembly by eliminating a connection step as taught by Crane, Jr. et al and as is notoriously well known in the art.

As recited in claim 2, Sega et al show a power combo chip (part of 20) positioned on the printed circuit board assembly positioned on the top surface of the base.

As recited in claim 4, Sega et al show an interface connector 24 attached to the printed circuit board 21 and to the base plate (part of 17).

As recited in claim 5, Sega et al are silent regarding a stiffener attached to a bottom surface of the flexible printed circuit.

Regarding the limitation "stiffener": See teaching, rationale, and motivation to combine teachings above for claim 1.

Regarding the limitation "bottom surface": There is no invention in relocation of known or obvious parts, absent evidence that the functioning of the device is changed by the claimed location. *In re Japikse*, 181 F.2d 1019, 86 USPQ 70 (CCPA 1950).

As recited in claim 8, Sega et al show that the printed circuit has a portion inserted into an interface connector 24.

As recited in claim 8, Sega et al are silent regarding whether the flexible printed circuit and the stiffener each have a coextensive portion inserted into the interface connector 24.

See teachings, rationale, and motivation to combine teachings above for claim 1.

2. Claims 3 and 9-11 are rejected under 35 U.S.C. 103(a) as being unpatentable over Sega et al (EP 760510) in view of Crane, Jr. et al (US Pat. No. 6797882 B1) as applied to claims 1-2, 4-5 and 8 above, and further in view of Koo et al (US Pat. No. 6243262).

Sega et al show a data storage device as described above.

As recited in claim 3, Sega et al show a top cover 19 attached to the base to form an enclosed space enclosing the actuator assembly (including 8), the one or more data storage discs 2 and the spindle motor 3.

As recited in claim 3, Sega et al arguably show the actuator and motor electronic control components on the printed circuit board assembly are outside the enclosed space (insofar as printed circuit board 21 is located beneath package cover 23 in "package chamber 26" (see col. 8, lines 5-8), and not beneath disk/actuator cover 19 in disk/actuator chamber 25); however, even if the printed circuit board of Sega et al were interpreted as not being "outside the enclosed space", the claim would still be obvious as follows.

As recited in claim 3, Koo et al teach putting actuator and motor electronic control components in a non-enclosed space (see Figs. 3-4).

It would have been obvious to one of ordinary skill in the art at the time the invention was made to reconfigure the enclosed space of Sega et al by removing package cover 23 so as to locate the actuator and motor electronic control components outside the enclosed space as taught by Koo et al. The rationale is as follows: one of ordinary skill in the art would have been motivated to locate the actuator and motor electronic control components outside the enclosed space so as to externally expose the circuit parts in order to discharge heat as taught by Koo et al (see col. 4, lines 1-8).

As recited in claims 9 and 11, Sega et al show that the flexible circuit comprises a pigtail lead 14 extending beneath the cover 19 to the actuator assembly to connect the electronics components to the actuator assembly (including 8).

As recited in claim 10, Sega et al show that the flexible printed circuit comprises a pigtail lead 15 extending beneath the cover 19 to the spindle motor 3.

3. Claims 6 and 12-13 are rejected under 35 U.S.C. 103(a) as being unpatentable over Sega et al (EP 760510) in view of Crane, Jr. et al (US Pat. No. 6797882 B1) as applied to claims 1-2, 4-5 and 8 above, and further in view of Bernett (US Pat. No. 6388834 B1).

Sega et al show a data storage device as described above.

As recited in claim 6, Sega et al are silent regarding whether the stiffener is metal and forms a ground plane for the circuitry on the flexible printed circuit.

As recited in claim 6, Bernett shows a metal ("grounding bracket 166 is made of an elongated a flat sheet of conductive material, such as spring steel or beryllium copper", see col.

5, lines 26-28) stiffener 166 forming a ground plane ("grounding flex circuit support bracket", see col. 5, line 22) for circuitry (the grounding flex circuit support bracket is "for" the circuitry insofar as it supports the circuitry and it protects the circuitry from EMI noise (see col. 5, lines 11-17, "grounding contact between the cover 104 and the base plate 102 provides an alternative pathway for EMI noise, as opposed to following, for example, the path along the actuator arm 114, and reduces the amount of noise transmitted from the head 118 to the external disc drive circuit board thereby reducing the potential number of read errors")) on the flexible printed circuit (see also arguments below).

It would have been obvious to one of ordinary skill in the art at the time the invention was made to add the stiffener of Bernett to the flexible printed circuit as taught by Bernett and Crane, Jr. et al. The rationale is as follows: one of ordinary skill in the art would have been motivated to eliminate an assembly step as taught above with reference to Crane, Jr. et al, and to reduce read errors by producing an inexpensive and easily installed alternative pathway for EMI noise as taught by Bernett (see col. 1, line 54-col. 2, line 57).

As recited in claim 12, Sega et al show a printed circuit assembly 21 for use in a data storage device having an actuator assembly (including 8) adjacent a spindle motor 3 rotating one or more data storage discs 2, the assembly comprising: a flexible printed circuit (including 14 and 15) having a pigtail lead 14 for connection to the actuator assembly of the data storage device and a pigtail lead 15 for connection to the spindle motor 3 of the data storage device; actuator control and signal processing electronics components 20 electrically connected to, the flexible printed circuit.

As recited in claim 12, Sega et al are silent regarding the components 20 mounted on the flexible printed circuit; and a stiffener plate.

See teachings, rationale and motivation for combining teachings above for claim 1.

Regarding the limitation "coextensive" in claim 12: There is no invention in a change of shape of known or obvious parts, absent evidence that the functioning of the device is changed by the claimed location. *In re Dailey*, 357 F.2d 669, 149 USPQ 47 (CCPA 1966).

As recited in claim 12, Sega et al are silent regarding the stiffener plate forming a ground plane for the components on the flexible printed circuit.

See teachings, rationale and motivation for combining teachings above for claim 6.

Sega et al show that the interface connector is attached to the printed circuit board, such that, when the printed circuit board is replaced by the flexible printed circuit and the stiffener according to the teachings, rationale and motivation above for claim 1, the interface connector would be attached to the flexible printed circuit and the stiffener as recited for claim 13.

See statement of rejection in the office action mailed February 1, 2006.

4. Claims 16 and 20 are rejected under 35 U.S.C. 103(a) as being unpatentable over Bernett (US Pat. No. 6388834 B1) in view of Crane, Jr. et al (US Pat. No. 6797882 B1).

As recited in claim 16, Bernett et al show a printed circuit assembly comprising: a flexible printed circuit (including 136), a stiffener plate (184, for example) coextensive with a portion of the flexible printed circuit forming a ground plane connected to the one or more components.

As recited in claim 16, Bernett et al are silent regarding the one or more electric circuit components requiring a ground and a power connection mounted on the flexible printed circuit.

As recited in claim 16, Crane, Jr. et al teach that "instead of connecting the flexible circuit board 800 to a printed circuit board having active and/or passive elements, a portion of the flexible circuit board 800 may include a stiffener. The stiffened portion of the flexible circuit board 800 can thus replace the printed circuit board described above" (see col. 9, lines 53-58).

It would have been obvious to one of ordinary skill in the art at the time the invention was made to replace the "disc drive printed circuit board (not shown)" of Bernett et al (col. 4, line 33) with a stiffened portion of the flexible circuit board as taught by Crane, Jr. et al by integrating the flexible circuit with the printed circuit board by adding a stiffener to the flexible circuit as taught by Crane, Jr. et al. The rationale is as follows: one of ordinary skill in the art would have been motivated to replace the board with the stiffened portion in order to simplify assembly by eliminating a connection step as taught by Crane, Jr. et al and as is notoriously well known in the art.

By applying the teaching of Crane, Jr. et al to the device of Bernett et al, the one or more discrete circuit components fastened to the disc drive printed circuit board of Bernett et al would become fastened to the flexible printed circuit and to one of the ground and power planes as recited in claim 20.

(10) Response to Argument

Applicant's arguments filed November 20, 2006, have been fully considered but they are not persuasive.

1. On page 9, 2nd full paragraph, Applicant argues that "the Office points to Crane as purportedly teaching substituting a flexible printed circuit board for the rigid board disclosed by the EP document." The Examiner has considered this argument thoroughly and asserts that

Crane, Jr. et al explicitly teach substituting a flexible printed circuit board for a rigid board by adding a stiffener to the flexible printed circuit board, thus making integral the flexible circuit and the printed circuit board. See Crane, Jr. et al, col. 9, lines 53-58 ("instead of connecting the flexible circuit board 800 to a printed circuit board having active and/or passive elements, a portion of the flexible circuit board 800 may include a stiffener. The stiffened portion of the flexible circuit board 800 can thus replace the printed circuit board described above").

Furthermore, separately forming a printed circuit board (such as 21 of Sega et al) and a flexible circuit (such as 14 and 15 of Sega et al), and joining them with a connector (such as 16 of Sega et al) is notoriously well known in the art to be disadvantageous. This knowledge, within the level of knowledge of a person of ordinary skill in the art, that separate formation and connection is disadvantageous, provides motivation for performing the integration taught by Crane, Jr. et al.

As evidence that the disadvantageousness of connecting the separately formed printed circuit board and flexible circuit was within the knowledge of a person of ordinary skill in the art, the Examiner has courteously presented the teachings of Crane, Jr. et al (US Pat. No. 6797882 B1) and Greenside et al (US Pat. No. 6315584 B1).

Electrical connections can be made in a variety of ways, many of them destructive. Soldering involves the application of heat, which can destroy some thermally sensitive electronic components. See, e.g., Crane, Jr. et al, col. 9, lines 41-49. Pin connectors have a plurality of drawbacks. Pin terminals "are subject to damage during normal handling", which "renders the electrical connector useless, and repair of the electrical connector (if possible) is time consuming and costly", resulting in costly replacement of otherwise undamaged parts. See, e.g., Greenside

et al (US Pat. No. 6315584 B1), col. 1, lines 34-46. Pin connectors also collect dust, resulting in loss of electrical contact, diminishing overall quality of electronic devices. See Greenside et al, col. 1, lines 47-58. Pin connectors further subject printed circuit boards to electrostatic discharge (ESD), which can damage sensitive electronics, leading to time consuming and costly repairs, or costly replacement of the circuit boards. See Greenside et al, col. 1, line 59-col. 2, line 5. Damage resulting from solder connection steps or pin connection steps can reduce yields in the assembly process. Reduced yields lead to increased marginal costs per device, and less profit on the sale of each device at market price.

In order to achieve higher profit, it is desirable to eliminate the connection step, with all its destructive effects notoriously well known in the disk drive art (and disclosed by Crane, Jr. et al and Greenside et al).

Furthermore, legal precedent established by prior case law supports the argument that integrating the printed circuit board and the flexible circuit would have been obvious. There is no invention in integrating parts which were formerly separately formed but joined together, nor in separately forming and joining parts which were formerly integrally formed. Absent unexpected results due to the claimed integration or separation, and absent any evidence that the integration or separation was beyond the level of ordinary skill in the art, such changes are merely a matter of obvious design choice and engineering choice. See *In re Fridolph* 135 USPQ 319 (CCPA 1962). See also *In re Larson*, 114 USPQ 347 (CCPA 1965).

On page 9, last paragraph, Applicant argues that "the Office has failed to disclose elimination of a printed circuit board within a disc drive." The Examiner has considered this argument thoroughly and asserts that Applicant's claim 1 is written in open language (see claim

1, line 1, "comprising"), such that the inclusion of additional, non-recited parts, would not defeat the rejection. Thus, Applicant's argument is moot.

On page 9, last paragraph, Applicant argues that "neither the Office nor Crane offer any clue as to how such a feat would be accomplished in a hard disc drive such as the one disclosed by the EP document. For example, the EP document specifies in col. 8, lines 40-42 that "integrated circuit elements ... are mounted on both surfaces of the circuit board 21." Use of a stiffener with a flex circuit having components on each side would be a practical impossibility".

The Examiner has considered this argument thoroughly and asserts that the test for obviousness is not whether the features of a secondary reference may be bodily incorporated into the structure of the primary reference; nor is it that the claimed invention must be expressly suggested in any one or all of the references. Rather, the test is what the combined teachings of the references would have suggested to those of ordinary skill in the art. See *In re Keller*, 642 F.2d 413, 208 USPQ 871 (CCPA 1981). In this case, the combined teachings would have suggested that a person having ordinary skill in the art replace the printed circuit board of Sega et al with a stiffened portion of the flexible circuit board of Sega et al as taught by Crane, Jr. et al. Even if Applicant were to persuade the Board that relocation of parts would have been necessary in order to achieve the integration explicitly taught by Crane, Jr. et al within the disc drive of Sega et al, mere relocation of parts does give rise to patentability, when the relocation fails to alter the functioning of the apparatus. *In re Japikse*, 181 F.2d 1019, 86 USPQ 70 (CCPA 1950).

On page 10, 1st paragraph, Applicant argues that "the EP document itself teaches away from any such modification" by "describing numerous ways in which to overcome the difficulties involved in connecting the motor and actuator flex circuits with the rigid board". The

Examiner has considered this argument thoroughly and agrees that a prior art reference that "teaches away" from the claimed invention is a significant factor to be considered in determining obviousness; however, the nature of the teaching is highly relevant and must be weighed in substance. A known or obvious apparatus does not become patentable simply because it has been described as somewhat inferior to some other apparatus for the same use. See *In re Gurley*, 27 F.3d 551, 554, 31 USPQ2d 1130, 1132 (Fed. Cir. 1994). Furthermore, the mere fact that Sega et al present another alternative to overcoming the difficulties involved in connecting the motor and actuator flex circuits with the rigid board falls far short of the kind of teaching away that might defeat obviousness because Sega et al do not criticize, discredit, or otherwise discourage the integration taught by Crane et al. See *In re Fulton*, 391 F.3d 1195, 1201, 73 USPQ2d 1141, 1146 (Fed. Cir. 2004). Thus, Sega et al do not teach away from applying the explicit teaching of Crane, Jr. et al to a disc drive environment.

On page 10, 2nd paragraph, Applicant argues that "Crane in no way envisioned replacement of the EP document's rigid printed circuit board, having actuator and motor electronic control components thereon, with a flexible printed circuit board." The Examiner has considered this argument thoroughly and asserts that the rejection of independent claim 1 is based upon a combination of references, not on Crane, Jr. et al alone. One cannot show nonobviousness by attacking references individually where the rejections are based on combinations of references. *In re Keller*, 642 F.2d 413, 208 USPQ 871 (CCPA 1981); In re Merck & Co., Inc., 800 F.2d 1091, 231 USPQ 375 (Fed. Cir. 1986). It is not necessary for Crane, Jr. et al to have envisioned all that is taught by Sega et al. So long as Crane, Jr. et al is

analogous art, it is proper to apply the teaching of Crane, Jr. et al to the disc drive environment of Sega et al.

A prior art reference is analogous if the reference is in the field of applicant's endeavor or, if not, the reference is reasonably pertinent to the particular problem with which Applicant was concerned. In re Oetiker, 977 F.2d 1443, 1446, 24 USPQ2d 1443, 1445 (Fed. Cir. 1992). In this case, Crane, Jr. et al is within Applicant's field of endeavor (feeding input and output signals to electronic circuit components), and reasonably pertinent to the particular problem with which Applicant was concerned (reducing losses at connectors and terminations). Thus, Crane, Jr. et al is analogous art, and the art's teachings are applicable in the disc drive environment of Sega et al.

On page 10, 2nd paragraph, Applicant states "Nor would one of ordinary skill in the art have found such a modification obvious in light of Crane, particularly in light of the EP document's evident requirement of a rigid printed circuit board for mounting of actuator and motor control components." The Examiner has considered this argument thoroughly and asserts that Crane, Jr. et al explicitly reach stiffening the flexible circuit when using it as a replacement for a printed circuit board by making the flexible circuit and the printed circuit board integral. See Crane, Jr. et al, col. 9, lines 53-58 ("instead of connecting the flexible circuit board 800 to a printed circuit board having active and/or passive elements, a portion of the flexible circuit board 800 may include a stiffener. The stiffened portion of the flexible circuit board 800 can thus replace the printed circuit board described above"). The use of the stiffener satisfies any "evident requirement" of rigidity.

On page 10, 3rd full paragraph, Applicant states that "even if one were to accept the Office's suggestion that it was known that one could so modify the EP Document, the Office has utterly failed to provide a motivation for doing so. While it is baldly asserted that doing so "in order to simplify assembly by eliminating a connection step" is "notoriously well-known in the art", the Office has not produced a shred of evidence to support this claim. Crane, in fact, makes no mention that doing so is well-known or that any particular benefit is thereby achieved." In the paragraph spanning pages 10 and 11, Applicant further laments that "the Office has failed to point out any source remotely supporting the reasoning. While it is baldly asserted that this is "knowledge generally available" no evidence has been presented suggesting this is so." The Examiner has considered this argument thoroughly and asserts that motivation need not be expressly stated in the prior art. Instead:

> the rationale may be expressly or impliedly contained in the prior art or it may be reasoned from knowledge generally available to one of ordinary skill in the art, established scientific principles, or legal precedent established by prior case law. *In re Fine*, 837 F.2d 1071, 5 USPQ2d 1596 (Fed. Cir. 1988); In re Jones, 958 F.2d 347, 21 USPQ2d 1941 (Fed. Cir. 1992). See also *In re Kotzab*, 217 F.3d 1365, 1370, 55 USPQ2d 1313, 1317 (Fed. Cir. 2000) (setting forth test for implicit teachings); *In re Eli Lilly & Co.*, 902 F.2d 943, 14 USPQ2d 1741 (Fed. Cir. 1990) (discussion of reliance on legal precedent); *In re Nilssen*, 851 F.2d 1401, 1403, 7 USPQ2d 1500, 1502 (Fed. Cir. 1988) (references do not have to explicitly suggest combining teachings); *Ex parte Clapp*, 227 USPQ 972 (Bd. Pat. App. & Inter. 1985) (examiner must present convincing line of reasoning supporting rejection); and *Ex parte Levengood*, 28 USPQ2d 1300 (Bd. Pat. App. & Inter. 1993) (reliance on logic and sound scientific reasoning).
>
> THE EXPECTATION OF SOME ADVANTAGE IS THE STRONGEST RATIONALE FOR COMBINING REFERENCES
>
> The strongest rationale for combining references is a recognition, expressly or impliedly in the prior art or drawn from a convincing line of reasoning based on established scientific principles or legal precedent, that some advantage or expected beneficial result would have been produced by their combination. *In re Sernaker*, 702 F.2d 989, 994-95, 217 USPQ 1, 5-6 (Fed. Cir. 1983).

See MPEP 2144. In this case, the Examiner has drawn from the knowledge generally available to one of ordinary skill in the art to establish the motivation to integrate the flexible circuit of Sega et al with the printed circuit board of Sega et al as taught by Crane, Jr. et al. The rationale is as follows: one of ordinary skill in the art would have been motivated to replace the board with the stiffened portion in order to simplify assembly by eliminating a connection step as taught by Crane, Jr. et al and as is notoriously well known in the art.

Furthermore, as a courtesy, the Examiner has clearly presented the teachings of Crane, Jr. et al (US Pat. No. 6797882 B1) and Greenside et al (US Pat. No. 6315584 B1) as evidence that the motivation was within the knowledge of a person of ordinary skill in the art. (See discussion above, which will not be repeated here.) These two references teach the disadvantages of using connectors, such as the connector 16 which connects the separately formed flexible circuit and printed circuit board of Sega et al. Because the disadvantages of separate formation and connection were explicitly taught in the prior art at the time Applicant's disclosure was made, it is clear that knowledge of the advantage of integration was within the knowledge of a person of ordinary skill in the art at the time Applicant's disclosure was made. The "particular benefit" of the integration is avoidance of the known disadvantages of separate formation and connection.

On page 11, 1st paragraph, Applicant argues that "while modifying the device of the EP document as proposed by the Office might eliminate a connection step, additional parts (e.g., stiffeners, ground and power planes, etc.) would likely need to be provided as well ... but of course entirely omitted from either of the references or the standing grounds of rejection". The Examiner has considered this argument thoroughly and asserts that Crane, Jr. et al explicitly teaches the use of a stiffener ("stiffener", see col. 9, line 56). Furthermore, the other features

upon which applicant relies (i.e., ground and power planes) are not recited in the rejected independent claim 1, which is the subject of Applicant's discussion beginning on page 9 of the Appeal Brief and ending with the second paragraph on page 11. Although claim 1 is interpreted in light of the specification, limitations from the specification are not read into claim 1. See *In re Van Geuns*, 988 F.2d 1181, 26 USPQ2d 1057 (Fed. Cir. 1993).

On page 11, 1st paragraph, Applicant states that "the Office's "reasoning from knowledge generally available" is in actuality nothing more that ***(sic)*** speculation, engaged in purely from a perspective of hindsight. Such hindsight reasoning is impermissible." Applicant continues on page 11, 1st full paragraph, "It remains clear that the Office has merely used the present application as a road map for combining these references solely for the purposes of rejecting the present claims." The Examiner has considered this argument thoroughly and asserts that the rejection is more than speculation insofar as it is supported by the evidence presented above. (See above discussion of the teachings of Crane, Jr. et al (US Pat. No. 6797882 B1) and Greenside et al (US Pat. No. 6315584 B1), which will not be repeated.) In response to applicant's argument that the examiner's conclusion of obviousness is based upon improper hindsight reasoning, it must be recognized that any judgment on obviousness is in a sense necessarily a reconstruction based upon hindsight reasoning. But so long as it takes into account only knowledge which was within the level of ordinary skill at the time the claimed invention was made, and does not include knowledge gleaned only from the applicant's disclosure, such a reconstruction is proper. See *In re McLaughlin*, 443 F.2d 1392, 170 USPQ 209 (CCPA 1971). In this case, the knowledge was within the level of ordinary skill in the art at the time Applicant's

disclosure was made, as evidenced by Crane, Jr. et al (US Pat. No. 6797882 B1) and Greenside et al (US Pat. No. 6315584 B1). Thus, the rejection is not impermissible.

2. On page 11, 4th full paragraph, Applicant argues that "claim ***(sic)*** 3 and 9-11 are allowable at least by virtue of their dependence from allowable claim 1." The Examiner has considered this argument thoroughly and asserts that claim 1 is not allowable. See discussion above.

In the paragraph spanning pages 11 and 12, Applicant argues that "Koo specifically provides a cutout 120a for heat dissipation; it's difficult to imagine why Koo would then proceed to place heat-generating components outside the cutout. Moreover, the EP Document goes to great lengths to provide circuit board 21 with means for sealing the disc drive enclosure from the inside (see col. 6, lines 46-54), yet the Office blithely suggests that the component somehow be placed outside of this housing." The Examiner has considered this argument thoroughly and asserts that one cannot show nonobviousness by attacking references individually where the rejections are based on combinations of references. In re Keller, 642 F.2d 413, 208 USPQ 871 (CCPA 1981); In re Merck & Co., Inc., 800 F.2d 1091, 231 USPQ 375 (Fed. Cir. 1986). In this case, the rejection is based upon a combination of references, and Applicant attacks each individually.

Sega et al arguably show the actuator and motor electronic control components on the printed circuit board assembly are outside the enclosed space (insofar as printed circuit board 21 is located beneath package cover 23 in "package chamber 26" (see col. 8, lines 5-8), and not beneath disk/actuator cover 19 in disk/actuator chamber 25). Even if the printed circuit board of Sega et al were interpreted as not being "outside the enclosed space", the claim would still be

obvious in view of the teaching of Koo et al that non-enclosed circuit parts advantageously discharge heat when externally exposed (see Koo et al, col. 4, lines 1-8, "The heat discharging port 120a is formed in the cover 120 to discharge heat occurring from operation of the hard disk drive (not shown) installed in the case 100. That is, heat generating portions of the hard disk drive (not shown) are respective circuit parts mounted on the component side 300a of the PCB 300, thereby externally exposing the respective circuit parts mounted on the PCB 300."). These teachings together suggest that a person of ordinary skill in the art would have been motivated to locate the printed circuit board of Sega et al outside any enclosed space in order to discharge heat by externally exposing the circuit parts as taught by Koo et al (see col. 4, lines 1-8). Thus, claim 3 is not allowable, and its dependent claims 9-11 are not allowable.

3. On page 12, last full paragraph, Applicant argues that claim 12 is allowable for the same reasons argued above for independent claim 1. This argument is not persuasive for the same reasons discussed above for independent claim 1.

On page 13, 1st paragraph, Applicant argues that "Bernett does not disclose a stiffener that grounds any portion of the flex circuit or circuit board; the stiffener is designed only to provide a pathway for EMI noise by providing grounding contact between a disc drive base and cover. Nowhere does Bernett suggest that the flex circuit is grounded by this stiffener." Applicant further argues that "while the bracket is both a "grounding bracket" and a "flex circuit support bracket" it in no way grounds the flex circuit. As such, the rejection simply cannot be sustained." The Examiner has considered this argument thoroughly and agrees that the stiffener does not ground the flex circuit. The rejection is sustained, because claim 12 does not require that the stiffener grounds the flex circuit.

Claim 12 recites the limitation "a stiffener plate coextensive with a portion of the flexible printed circuit forming a ground plane for the components on the flexible printed circuit" in the last 2 lines. The stiffener of Bernett is "forming a ground plane" insofar as the stiffener grounds the base and the cover. Moreover, the stiffener is "for the components" insofar as the stiffener reduces EMI noise protects the circuitry from EMI noise (see col. 5, lines 11-17, "grounding contact between the cover 104 and the base plate 102 provides an alternative pathway for EMI noise, as opposed to following, for example, the path along the actuator arm 114, and reduces the amount of noise transmitted from the head 118 to the external disc drive circuit board thereby reducing the potential number of read errors"). Moreover, the components of Bernett are on the flexible printed circuit of Bernett. Thus, the limitation "stiffener plate ... forming a ground plane for the components on the flexible printed circuit" is met.

The limitation "coextensive with a portion of the flexible printed circuit" is broadly recited, insofar as the "portion" can be arbitrarily selected to include any portion of the flexible printed circuit which is backed by the stiffener, regardless how much of the flexible printed circuit overhangs the stiffener and remains flexible. Thus, the limitation is met regardless of the shape of the stiffener. Furthermore, the limitation "coextensive" merely describes a shape. There is no invention in a change of shape of known or obvious parts, absent evidence that the functioning of the device is changed by the claimed location. *In re Dailey*, 357 F.2d 669, 149 USPQ 47 (CCPA 1966). Applicant has provided no evidence of unexpected results due to any particular shape of the stiffener.

4. On page 13, last paragraph, Applicant argues that "Bernett does not disclose a stiffener that grounds any portion of the flex circuit or circuit board". The Examiner has considered this

argument thoroughly and agrees that the stiffener does not ground the flex circuit. The rejection is sustained, because claim 16 does not require that the stiffener grounds the flex circuit. See arguments above for claim 12.

Applicant's arguments have been fully considered, but as they are non-persuasive for reasons articulated above, the rejections are maintained.

(11) Related Proceeding(s) Appendix

No decision rendered by a court or the Board is identified by the examiner in the Related Appeals and Interferences section of this examiner's answer.

For the above reasons, it is believed that the rejections should be sustained.

Respectfully submitted,

JAW

JULIE ANNE WATKO
PRIMARY EXAMINER

02/01/2007

Conferees:

DDB

2/2/07

HTN.

2/6/07.